

Designed to Mislead Reading University survey on GM coexistence

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Introduction

Some English farmers have recently received a postal survey on “adopting novel technologies” from the Centre of Agricultural Strategy (CAS) at the University of Reading. The survey is part of a wider survey also covering Czech Republic, Germany, Portugal, Romania and Spain.

The introductory letter from CAS Director Richard Trantor, dated November 2012, makes it clear that the survey is, in fact, about the coexistence of GM and non-GM crops:

“The European Union and the British Government are likely to permit the commercial cultivation of certain GM crops in the UK in the not too distant future. The adoption of these crops may provide British farmers with benefits such as lower production costs or higher returns. However farmers will have to comply with certain conditions, called coexistence rules, to minimise the risks of contaminating crops on neighbouring farms with GM materials. The Government is considering what form these coexistence rules should take, and this survey is designed to explore the feasibility and costs of a number of potential coexistence measures to help inform the decisions of policy makers.”

The main content of the survey focuses exclusively on coexistence in oilseed rape (OSR).

No information is given about who commissioned the survey or who is paying for it. It is not clear if the Welsh Assembly Government, Scottish Government or Northern Ireland Assembly were involved in funding or planning the survey or, indeed, if survey forms have been sent to Welsh, Scottish or Northern Irish farmers.

This briefing examines the content of the survey in detail and highlights inaccurate, misleading and weak information in it.

Why now?

A number of cultivation applications for GM crops are in the pipeline in the European Union (EU). According to the industry-backed GMO Compass these include herbicide tolerant (HT) crops that could be grown in the UKⁱ:

- Two glufosinate ammonium (GA) tolerant OSR varieties.
- Two glyphosate tolerant sugar beet varieties.
- Maize varieties tolerant to both glufosinate ammonium and glyphosate (NB: fodder maize varieties suitable for UK conditions may or may not be available).

A number of insect resistant GM maize varieties are also under consideration, many of which are stacked with HT, but none of these are destined for the UK as there are no serious insect pests of maize present, so there is no justification for the extra expenditure on GM seeds.

Misleading and inaccurate information

The CAS survey contains misleading and inaccurate information, which could produce bias in the responses and consequently lead to poor decision making by the Government. For example:

1. Question 24 asks: “Suppose GM oilseed rape was licensed by the Government for, say, 2015 planting year, would you consider planting GM oilseed rape?”

The question suggests that a decision to approve GM oilseed rape could be made in time for 2015 commercial planting. The only two varieties that could meet such a deadline are Bayer CropScience varieties with tolerance to glufosinate ammonium.

GA tolerant Spring and Winter varieties were trialled in the UK Farm Scale Evaluation (FSE) from 1999-2003, and in 2004 the Government announced,ⁱⁱ following advice from the Advisory Committee of Releases to the Environment,^{iii and iv} that approval would not be granted because of the indirect effect of the crop's management on farmland wildlife. The FSE results showed that GA tolerant OSR caused a significant reduction in weed cover and weed seed fall, which support insects and birds higher up the arable ecosystem food chain. This would in turn also reduce the populations of farmland species, many of which are already harmed by existing intensive farming techniques. The UK Government would have to reverse the 2004 decision and go against its scientific advisory committee on GM in the absence of any new evidence to justify such a reversal.

EU authorisation is a prerequisite for the two Bayer GM OSR varieties. The two applications for GA tolerant HT oilseed rape are still in the early stages of the EU approval process, making 2015 a very unlikely target date for commercial growing.

Varieties destined for the UK market would also be required to undergo two years of National List Trials in order to gain approval for entry on the National List of Varieties before they could be grown commercially.

2. The introductory letter and information on GM crop regulation (in section E) are contradictory in the information they give about EU legislation and guidance on coexistence.

The letter states that coexistence rules aim *"to minimise the risks of contaminating crops on neighbouring farms with GM materials"*. However the text in section E says measures farmers take should seek *"to avoid unintended contamination of non-GM products"*. The latter correctly reports the wording of the Directive 2001/18, which says, *"Avoid the unintended presence of GMOs,"* and a legal opinion on Defra's 2006 consultation on coexistence confirmed the need to avoid unintended GM presence rather to merely minimise it.^v

The wording of the legislation implies there should be no GM presence detectable in neighbouring crops. This has a considerable impact on the measures GM farmers would be required to take to protect neighbouring crops from contamination.

3. Section E provides examples of what coexistence measure might involve for a GM farmer.

These are substantially different from the proposals put forward in 2006 by Defra's consultation on managing the coexistence of GM, conventional and organic crops.^{vi} For instance the questionnaire only suggests individual farmers might be liable for paying compensation, while Defra provided several options for compensating non-GM farmers for economic losses due to contamination including:

- Farmers responsible for the contamination being liable (if they could be identified).
- All GM farmers paying into compensation fund.
- GM seed companies being liable.

The suggested separation distance for OSR in Section E (75 metres) is substantially different from that suggested by Defra in 2006^{vii} (35 metres), SCIMAC in the farm scale trials (50 metres) and by other EU Member States (for instance 4,000 metres in Latvia).^{viii} In order to provide useful information for policy makers a range of separation distances should have been offered to gauge farmer opinion on the costs and practicalities of avoiding contaminating neighbouring crops through cross-pollination by wind or insects.

4. Question 25 includes the statement, "I have more faith in the use of insecticide to combat pest and disease."

This implies that GM OSR would contain genes to kill or repel insects carrying plant diseases. This is clearly misleading because no application for such a GM OSR exists, so it would not be possible to get approval for the 2015 growing season. The only GM oilseed rape varieties that might be available are HT, which would have no impact of pests or diseases.

The same question also says, “*It is associated with complicated management (eg, coexistence like refuge areas, etc).*” This suggests there is confusion between insect resistant (Bt) crops and HT crops in the minds of those who designed the survey. The use of refuges is required in Bt crops to delay the development of pest resistance to the Bt toxin produced by GM maize (for instance). Refuges would not be required in GMHT OSR crops.

Hypothetical questions

Questions 28, 29 and 30 specifically asked about farmers’ knowledge of GM OSR and possible future decisions about growing it on their farms. The questionnaire provides absolutely no information on the price of GM seeds (likely to be significantly higher than conventional), the price of the herbicide to be sprayed on the crop, the number of likely applications of herbicides or the yield of the GM crop compared with a non-GM variety. Nor do the questions mention the distinct possibility that sales contracts for GM oilseed rape will forbid mixing GM seed with farm saved non-GM seed from previous harvests, or that saving of GM seeds will be forbidden by GM companies, with resultant economic losses for farmers (see below for further complications of banning farm saved seed).

Reports from Australia indicate that non-GM OSR (called canola there) is trading at a premium of between AUD\$14-30/tonne compared to GM.^{ix} The CAS survey provides no information or sources of information about yields from GM or non-GM varieties in North America or Australia. Trials of GM and non-GM OSR at the University of Idaho in 2010 showed that non-GM varieties performed best in the main trials (5.7% higher yield on average). In another trial, which used a wider planting spacing, a GM variety did yield highest, but the research team attributed this to the non-GM traits of earliness and branching ability in the variety that then became host to the GM traits – GM was not responsible for the yield.^x

Farmers can only provide hypothetical answers to these questions unless they are prepared to spend considerable time researching comparative yield and price data from outside the UK and EU and then interpret it from their own perspective.

Questions 29 and 30 also ask, “*How much GM oilseed they would grow?; in how many parcels of land?; and how they would market GM oilseed rape?*” None of these questions would normally be addressed until close to planting when current prices and market data would be available to guide the decision. It is therefore doubtful whether the survey would provide very much useful information on how farmers would respond if GM OSR could be legally grown in the UK.

Important issues missing or understated

Pollination

The CAS survey makes limited reference to the position of beekeepers in relation GM crop coexistence (Question 34), so it underplays the importance of honeybees to OSR growers and the significance of GM pollen in honey.

The value of pollination services provided by professional and amateur beekeepers to farmers and growers is £510 million according to a recent report by Reading University for Friends of the Earth.^{xi} Oilseed rape is 25% insect pollinated, and the same report valued this at £115 million in 2009 from enhanced yields.

Following the 2011 judgment by the European Court of Justice^{xii} the presence of GM pollen in honey must now be included in any authorisation to cultivate and market a GM crop and that the honey containing GM pollen requires a GM label. GM labels may deter would-be honey purchasers, so GM OSR fields may be avoided as far as possible by beekeepers, who frequently place hives near OSR crops to enhance pollination rates. One consequence of this could be a reduced yield in GM crops and neighbouring non-GM crops (the magnitude of which would depend of the numbers of wild pollinators in the vicinity at the time of flowering). The advice of the British Beekeepers Association on GM test sites (as of 1 November 2010) was “*for beekeepers to move their colonies away from test sites. A probable safe distance is in excess of six miles*”^{xiii}. Farmers thinking about completing the survey should be aware that adopting GM OSR could lead to a loss

of pollination services by beekeepers keen to avoid having to put GM labels on their honey, which may consequently reduce OSR yields.

Certified seed production

Some farmers grow crops to produce seed for seed companies. These crops have to achieve certain purity standards in order to be approved for sale as certified seed.

The UK has already imported non-GM OSR seed contaminated with GM on two occasions.^{xiv and xv} Despite more than a decade of discussion the EU has not set any threshold for GM contamination of seed. GM presence in seeds guarantees a GM crop. In order to avoid such GM contamination becoming routine GM presence in seed would need to be set at zero and regulated by ensuring that the absence of GM is confirmed by tests set at the lowest current limit of detection (which should become lower over time as techniques improve). GM farmers, seed cleaners and companies will have to take very special care to avoid contaminating non-GM seed supplies. Full economic and environmental liability on GM companies should be introduced to help ensure that compensation for seed contamination claims would be higher because of the greater value of the crop to affected companies.

Farm saved seed

Farmers thinking of using GM OSR should reflect on the probability that, if the experience of North American farmers is mirrored in the UK, they will not have the right to save seed and will therefore lose the financial benefits of doing so. At present farm saved seed is often used with certified seed by OSR growers to reduce variable costs.^{xvi} This brings a saving of around £11.80/hectare, or around £4.9 million nationally.^{xvii} Prohibiting farm saved seed could also result in a significant loss of agricultural biodiversity over time as older varieties are dropped from company seed lists, and farmers may find it difficult to maintain these varieties without infringing the intellectual property rights of the agri-biotech companies.

Managing weed resistance

Widespread adoption of GM HT crops in the US and South America has resulted in the rapid evolution of weeds resistant to glyphosate. There are now 11 glyphosate resistant weeds infesting millions of hectares of Roundup Ready (RR) crops in the US. Weed control strategies have become much more complex and costly as a result.

The development of these so-called superweeds stems from farmers having become far too reliant on using only one herbicide on RR crops. The “solution” being offered to US farmers by the agri-biotech companies is a range of herbicides to be used in rotation, alongside, in mixtures of or in combination with glyphosate. So far seven additional herbicides have been put forward as part of the package of measures to try to control the spread of resistant weeds. It is suggested that farmers growing RR crops use these chemicals either as soil-acting residuals, for clearing seedbeds prior to sowing or as over-the-top applications on GMHT crops, which now include crops with tolerance to dicamba and 2,4-D in addition to glyphosate.^{xviii and xix}

The existence of such suggestions from GM companies disproves their claims that weed control in GMHT crops is cheaper and simpler. If GMHT crops are approved for use in the UK strategies for delaying the development of resistance would have to be adopted from the start, so the costs of production would rise. The CAS survey does not mention this issue at any point, although this is likely to impact on gross margins for GM OSR crops.

Gardeners and allotment holders

The questionnaire fails to mention the potential for crops being grown by gardeners and allotment holders being contaminated by GM crops being grown nearby. A legal opinion reviewing a 2006 consultation document from Defra made it clear that the omission of gardeners and allotment holders rendered the consultation exercise “fundamentally flawed” because their products could be considered to be “placed on the market” even if they are distributed free of charge.^{xx}

Unrealistic and illogical scenarios

The survey presents 12 different growing scenarios and seeks comments from farmers. Respondents are asked to consider, as potential GM growers, five aspects of coexistence used in different combinations to produce the scenarios. These five aspects are:

- Liability for contamination of neighbouring crops.
- Required isolation distance.
- Informing neighbours regarding intention to grow GM oilseed rape.
- Temporal separation of GM and non-GM planting to prevent synchronisation of flowering.
- Increased outputs from GM crops.

The scenarios offered in all the scenarios are described in Table 1 below.

Table 1 Range of growing scenarios suggested by CAS survey

Policy area	Option 1	Option 2	Option 3	Option 4
Liability	Never liable	Liable when not following coexistence rules	Always liable	
Isolation distance	No isolation required	50 m	100m	
Informing neighbours pre-planting	No disclosure needed	Disclosure in a public register	Disclosure to your neighbours only	
Temporal separation	Not needed	2 weeks	4 weeks	
Increase in output	£20/hectare	£60/hectare	£100/hectare	£120/hectare

Liability options

The option of “never liable” is not clear. Respondents may take this to mean no one is liable, so farmers who suffer GM contamination would have no avenue of redress. This immediately raises doubts as to the fairness of this option. Respondents may well also fear finding themselves contaminated but left high and dry, or they may see the potential for major disputes arising between neighbours in these circumstances. The second option of “no liability if the rules are followed” also means that contaminated farmers could be left without compensation, which may be viewed as unfair.

Nowhere does the survey mention that at present no insurance cover against compensation claims is available to GM growers. The failure to offer other options, such as a compensation levy into which all GM farmers contribute, or making biotech companies strictly liable for all economic and environmental damage caused by their products (as long called for by GM Freeze) seriously limits the value of the survey in developing a fair and workable policy on liability.

Isolation distances

The option for “no isolation distance” is very unrealistic. Even Defra proposed a separation distance in its 2006 consultation document (an entirely inadequate 35 metres). The other distances would provide some measure of protection if the objective was to minimise contamination, but as the requirement of the EU Directive is to *avoid* contamination much greater distances are needed, including separation from beehives (see above). Factors such as separation distance for seed production and for crops intended for farm saved seeds are ignored despite the fact they should be in the minds of farmers contemplating growing GM OSR to avoid potential impacts on neighbours.

Informing neighbours

These options lack important details that may influence the cost of taking the various measures offered or impact on community relations. Planting a GM OSR crop without warning neighbours is recipe for serious disputes and the involvement of lawyers. The survey offers no guidance as to what “informing neighbours” means, or which neighbours to contact, or whether this includes beekeepers or gardeners/allotment holders. “Information” could be provided by phone, letter,

email, personal visits, notices on posts along roads, adverts in local newspapers or a combination of these. Each will come at a cost that farmers would need to consider before answering the survey. This lack of detail means that respondents will apply their own ideas as to what might be required, which will seriously limit the value of the survey as a guide to policy development as Government will have no information at its disposal about what assumptions were used to arrive at survey responses.

Temporal separation

These options will raise a lot of questions in the minds of respondents, such as:

- Who should plant first?
- How would the decision about who plants first be agreed?
- Will compensation be offered if the second crop has a lower yield?
- How would yield be assessed and by whom?
- What happens where three or more neighbours are involved?
- What happens if the first crop has a delayed germination and the later crop catches it up by flowering on time?
- What happens if plants along tramlines and along field margins in early crops flower later (due to damage to plants, reduced light, compaction or water logging) and are synchronous with the later crop?

Once again the lack of detail in the options will lead to decision making that is not based on the realities of farming.

Increased output

Three possible outcomes are offered, and all assume that GM crops will produce higher outputs, which may not be accurate. The figures given are said to be increases in outputs, which suggests increased yield in GM OSR would generate more income. As noted above the presence of a GMHT trait does not automatically lead to an increase in yield, so this assumption introduces a very unhelpful bias into the survey.

The four increases in output used in the survey take no account of the variable costs of producing the GM crop, which is normally taken from the output to give a gross margin for the crop.^{xxi} Respondents would find it very difficult to calculate the gross margin on a theoretical GMHT OSR crop without critical information like the price of the seeds and herbicides and how the farm gate price compared with conventional oilseed prices, which are currently very favourable. The costs of ensuring compliance with coexistence measures would also come into the equation as an additional variable cost in GM cultivation. Higher costs of GM cultivation could also arise from the presence of herbicide tolerant volunteers in following crops (including those of neighbours), deploying measures to prevent weed resistance and cleaning equipment before moving on to non-GM planting or sharing equipment with other farms.

Illogical Scenarios

Several of the scenarios offered by the survey are internally inconsistent, for example:

Scenario 1 assumes either no temporal separation between GM and non-GM crops or four weeks separation, yet the increase in output is the same for both (£20/hectare). This assumes there would be no yield penalty from a delayed sowing date when research suggests that earlier sowing gives more consistent seed yields.^{xxii} This scenario also appears to assume that the GM crop was sown first which may not be agreed because the neighbouring farmers who would stand to get a lower yield by sowing four weeks later.

Scenario 2 raises similar issues. In this case the temporal separations are two and four weeks, but that the latter produces a £120/hectare increase in output compared to only a £60/hectare increase for the shorter delay in sowing. There is no explanation provided in the survey, and given that other coexistence measures considered would have no impact on yields the scenario is not realistic.

The same pattern of inconsistency is present in several other scenarios, all of which assume no yield penalty for delayed planting.

Out of touch

Question 21 on where farmers get their information about new developments in farming does not include the internet as an option, nor can the internet be added by the respondent. This suggests that those designing the survey are out of touch with how modern farmers operate.

Conclusions

The information provided to potential respondents with the survey form is not sufficiently detailed to allow for a true picture to emerge as to how the coexistence of GM and non-GM oilseed rape is likely to influence future decisions by farmers.

Several basic factual errors undermine the credibility of the survey.

The underlying assumptions are all favourable towards the economic performance of the GM oilseed rape and ignore the very real possibility that prices attainable for GM crops may be lower in the EU food market, which has only sourced non-GM food ingredients for the last 14 years to meet public demand. The current experience of Australian farmers adopting GM OSR shows this is a likely outcome.

GM oilseed rape has already contaminated UK seed imports and crops, and compensation has been paid to growers following the 2000 incident. Experience in Australia and Canada suggests that GM oilseed rape will result in frequent contamination with resulting market disruption. The current absence of a proper liability scheme means these costs will be borne by farmers, processors and retailers and not biotechnology companies.

A survey with inbuilt pro-GM bias that fails to present a balanced picture is of no help to farmers, taxpayers or decision makers developing policy on coexistence. Instead a biased survey leaves the impression that GM is a cheaper and easier way to increased yields and incomes, which ongoing farmer experience in other countries shows is not true. Given the weaknesses of the survey design overall, perhaps spreading this underlying message was the real intention of the exercise. If such a survey is needed, it would be better to start again with a far greater level of balanced information provided for respondents.

Full transparency is needed about who is funding the survey, why and how the results will be disseminated to decision makers, the public and farmers. This is not a problem unique to this survey. Publicly-funded research overseen by the Technology Strategy Board and the BBSRC lacks transparency and often is irrelevant to the immediate and longer-term needs of farmers.

Notes

ⁱ GMO Compass [database](#), 2012

ⁱⁱ Hansard, 9 March 2004. [Column 1379-1382](#)

ⁱⁱⁱ ACRE, 2004. [Advice on the implications of the farm-scale evaluations of genetically modified herbicide tolerant crops \(pdf\)](#)

^{iv} ACRE, 2005, [Advice on the implications of the farm-scale evaluations of genetically modified herbicide tolerant winter oilseed rape \(pdf\)](#)

^v Lasok P and Haynes R, 2006. [Legal Opinion In the Matter of Defra's Consultation on Proposals for Managing the Coexistence of GM, Conventional and Organic Crops](#)

^{vi} Defra, 2006. Consultation on Proposals for Managing the Coexistence of GM, Conventional and Organic Crops

^{vii} Defra, 2006. *Ibid*

^{viii} GM Freeze, 2006. [Response to the Defra Consultation on Proposals for Managing the Coexistence of GM, Conventional and Organic Crops](#)

^{ix} *Weekly Times Now*, 11 October 2012. "[GM canola takes a cut](#)"

^x GM Freeze, 2011. [Plant Breeding and Crop Yields – Can we rely on GM crops to increase yield?](#)

^{xi} Breeze TD, Roberts SPM and Potts SG, 29 April 2012. [The decline of England's Bees: Policy review and recommendations](#) (pdf), University of Reading and Friends of the Earth England, Wales and Northern Ireland

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- ^{xii} European Court of Justice, 6 September 2011. [Judgment in Case C-442/09 – Karl Heinz Bablok and Others v Freistaat Bayern](#) (pdf)
- ^{xiii} British Beekeepers Association, updated. Policy Statement on Genetically Modified Crops (GMOs) accessed 01/11/2010 from <http://www.bbka.org.uk/news/statements/statement-on-genetically-modified-crops-gmo.shtml>
- ^{xiv} Friends of the Earth, May 2000. “[Contaminated GM Crops: The ‘accidental’ release of GM oilseed rape into the UK countryside](#)”
- ^{xv} GM Freeze, 4 December 2010. [GM Contaminated Oilseed Rape in Somerset: Freedom of information action tribunal hearing](#)
- ^{xvi} Nix J, 2012. *Farm Management Pocket Book*, 43rd Edition 2013.
- ^{xvii} National Association of Agricultural Contractors, 2012. Personal communication.
- ^{xviii} GM Freeze and PAN UK, 2 August 2012. [GM Herbicide Tolerant Crops – Less Equals More](#)
- ^{xix} Equities.com, 10 December 2012. “[BASF, Monsanto recommend tank mixing HEAT® and Roundup Transorb® HC to optimize weed control for pre-seed burnoff](#)”
- ^{xx} Lasok P and Haynes R, 2006. *Op cit*
- ^{xxi} Nix J, 2012. *Op cit*, Page 11
- ^{xxii} Mendham NJ, Shipway PA and Scott RK, April 1981. “[The effects of delayed sowing and weather on growth, development and yield of winter oil-seed rape \(*Brassica napus*\)](#)”. *The Journal of Agricultural Science*, 96: pp 389-416.
doi:10.1017/S002185960006617X